POV FATALITIES
THRU FEB FY00 44
THRU FEB FY01 37

ARMY GROUND RISK-MANAGEMENT PUBLICATION

COUNTERMEASURE

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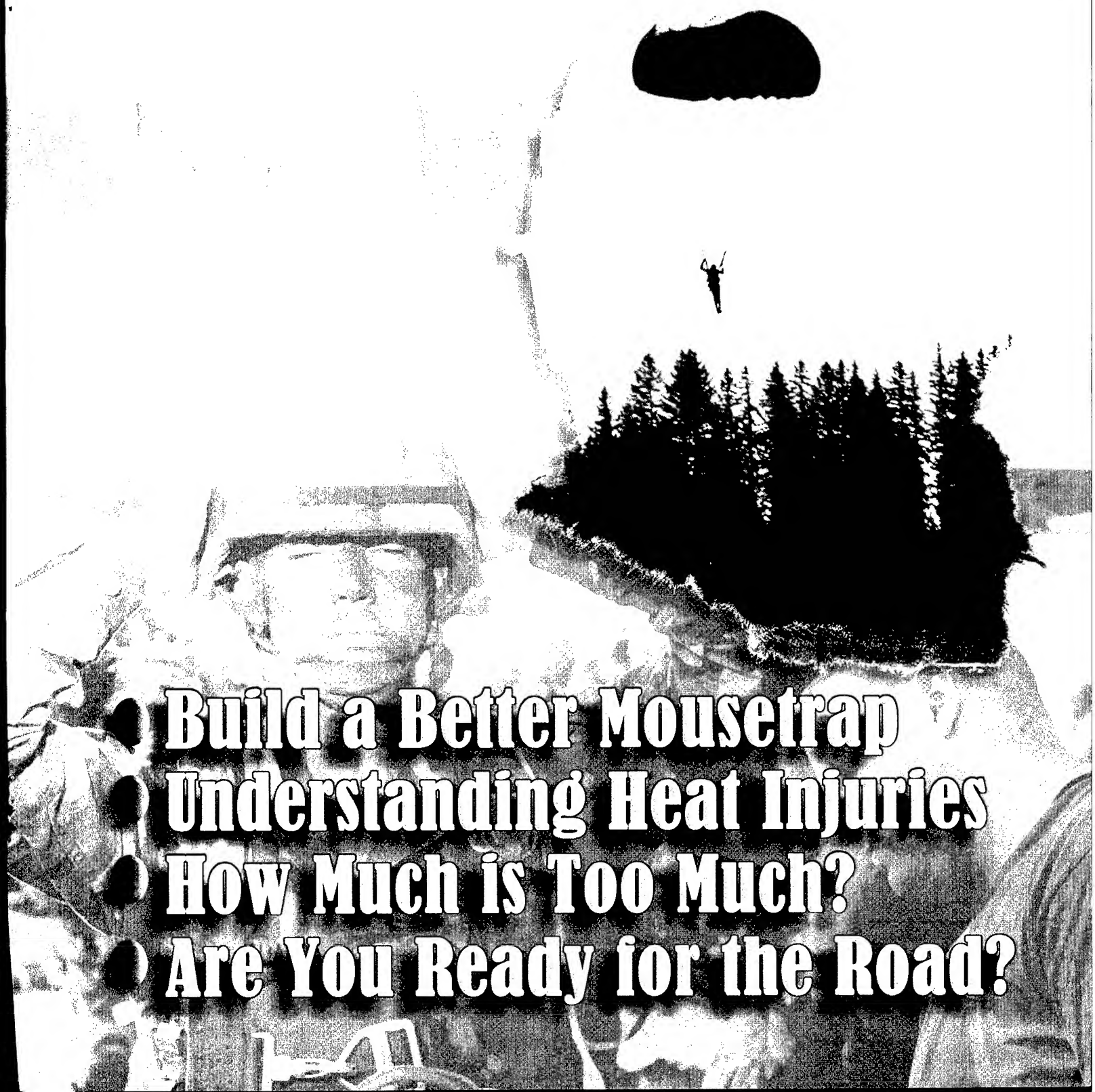

Build a Better Mousetrap
Understanding Heat Injuries
How Much is Too Much?
Are You Ready for the Road?

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The Official Safety Magazine for Army Ground Risk-Management

Investigators' Forum

Paratroopers have a "can-do" attitude, a spirit, and a way of life that make them unique. Unfortunately, that attitude can get them needlessly hurt as one Master Rigger found out when he had a rig modified.

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Remember When

The author shares his story of when he failed to report an accident to his chain of command.

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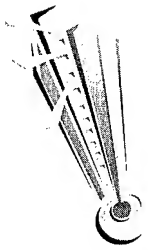
Understanding Heat Injuries

Hot weather is just around the corner. Before it gets here, you need to know how to prevent heat injuries, how to recognize signs and symptoms if they do occur, and the proper treatment.



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How Much Is Too Much?

Most people know that dehydration can cause serious health consequences. What most don't realize is that too much of a good thing—water—can also be dangerous, even deadly.

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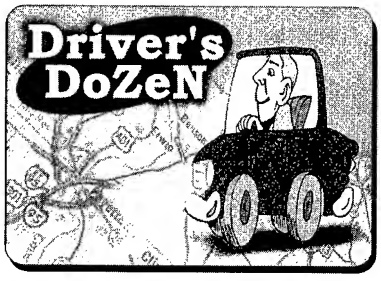
Get the New Video—"Driver's Dozen"

Find out how to order the new POV video starring SGT Safety. This flick targets 12 key areas of traffic safety.



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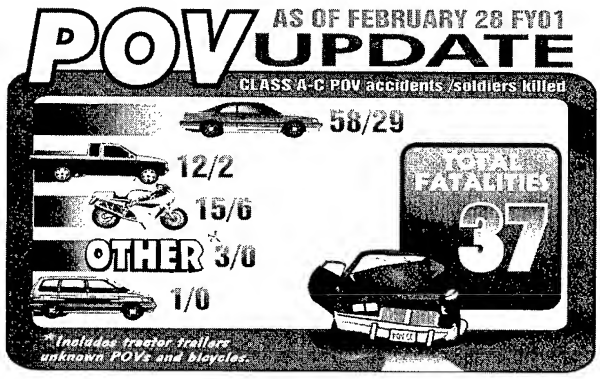

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Gene M. LaCoste
Brigadier General, U.S. Army
Commanding Officer

Written by accident investigators to provide major lessons learned from recent centralized accident investigations.

Investigators' Forum

Build a Better Mousetrap

A division command sponsored parachute demonstration team (PDT) was conducting training jumps. They were wearing non-standard rigs designed to enhance their ability to conduct various parachute maneuvers. One such maneuver was a cutaway.

What happened?

A jumper with a United States Parachute Association (USPA) D License-Master, a USPA Professional Exhibition rating (PRO), and a Federal Aviation Administration (FAA) Master Rigger rating, exited a UH-60L aircraft at approximately 7,000 feet above ground level (AGL) to perform an intentional malfunction and parachute cutaway.

At approximately 5,500 feet AGL, the jumper deployed the main chute. At approximately 4,500 feet AGL, he successfully induced a malfunction by releasing the right side riser. At this point, he was suspended under the parachute attached by the left side riser only. He rode the malfunction for approximately 1,000 feet, and then began attempting to cutaway the left side riser to complete the release of the malfunctioning canopy.

From approximately 3,500 feet AGL to impact with the airport tarmac, the jumper attempted to release the left side riser numerous times—first with one hand, and then with both hands by pulling on the cutaway handle. When the left side riser failed to release, he deployed his reserve parachute. The reserve parachute bridal and free-bag became entangled with the malfunctioning parachute. He attempted, but was unsuccessful, in pulling/throwing the reserve parachute out and away from the malfunctioning parachute until he collided with the ground.

The PDT members initiated first-aid within seconds of impact, 911-assistance was requested, and vital signs were checked. A backboard was not an item within the PDT medical equipment; however, civilian emergency medical services personnel onsite provided a backboard to ensure spinal immobilization throughout treatment and evacuation.

Why did it happen?

The original Tridem rig was designed for a single point release system that releases both risers simultaneously. The modified rig used in this jump was a onetime rig manufactured to this jumper's specifications. He was the first to jump with this rig. His intent with this modification was to gain the ability to release one riser at a time through the use of two primary cutaway handles. It is important to note that there are non-standard, unmodified rigs available that are specifically designed to allow a jumper to perform this maneuver.

By changing the original configuration of the rig, the function of the rig was altered and this had specific hazards associated with the change.

The result was that during the jump, when the jumper released the first riser with the cutaway handle, the second riser twisted due to the oscillating parachute. The cutaway cable then became bound in the twisted second riser. This made it impossible to successfully pull the second cutaway handle and release the second riser.

When the jumper requested the alteration of the main parachute from a single point release system to that of a dual point release system, he failed to properly take into account the possible hazards associated with this change. By changing the original configuration of the rig, the function of the rig was altered and

this had specific hazards associated with the change.

The jumper failed to take into consideration the additional time required to perform dual point cutaway procedures with the altered rig. He exited the aircraft at 7,000 feet, the manufacturer's recommended altitude for deployment of the canopy for the unaltered rig. This caused him to have less time to conduct emergency procedures for the unintentional malfunction of the cutaway parachute. He failed to assess and develop reasonable altitude standards of canopy deployment for the altered rig.

The jumper did not properly develop and/or rehearse emergency procedures for this situation, and he was subsequently unprepared to react.

In addition, he did not use a hook knife on the rig, which would have allowed him to cutaway the malfunctioning parachute. In this case, he deployed his reserve parachute; however, the reserve was unable to successfully deploy because of insufficient wind velocity due to the malfunctioning parachute over his head. Also, the emergency procedures in the PDT Airborne Standard Operating Procedures (ASOPs) were not specified for this particular maneuver with this modified rig.

The chain of command was unfamiliar with the conduct of training, to include regulations, ASOPs, programs of instruction, and equipment and parachuting maneuvers. This ineffective process impeded the ability of the PDT and chain of command to identify hazards, take appropriate measures to mitigate risks, and make informed decisions. Additionally, the chain of command was overconfident in the parachute demonstration team's capabilities, and as a result, they received inadequate supervision.

The tragic result of this accident is that this soldier will likely have to undergo months and possibly years of physical rehabilitation.

Countermeasures

The chain of command should:

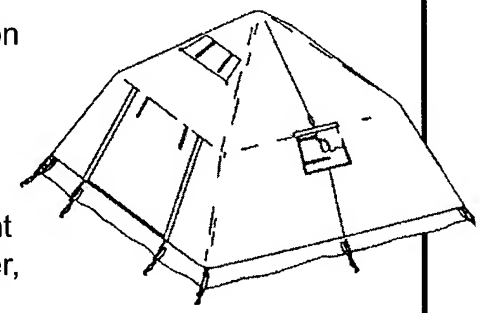
1. Evaluate existing non-standard equipment in PDTs to ensure adequacy of design, and ensure that effective training plans and procedures are in place.
2. Integrate tasks, conditions, standards, to include emergency procedures and applicable guidance, into the use of all PDT equipment.
3. Ensure the procurement of non-standard equipment is formalized and closely supervised.
4. Be familiar with applicable regulations, SOPs, equipment and maneuvers in order to make informed PDT risk management decisions.
5. Integrate each parachuting location/ task/equipment/ maneuver into risk management order to mitigate hazards based on informed decisions.
6. Ensure PDT pre-accident plans are reviewed, disseminated, and rehearsed.
7. Make sure risk management is conducted IAW FM 100-14, and take into consideration FAA regulations and USPA guidelines.

Remember: Risk management is part of taking care of our soldiers!

POC: Ground Systems and Accident Investigation Division, DSN 558-3562 (334-255-3562)

FOR IMMEDIATE RELEASE February 28, 2001

SAFETY ALERT NOTICE—SOLDIER CREW TENT



The Army recently lost two soldiers as a result of carbon monoxide poisoning. While on a field training exercise, two soldiers returned to their soldier crew tent and started a commercial off-the-shelf (COTS) heater to warm up. The soldiers then closed the tent while the heater was on. Because the tent was essentially airtight, a lethal environment was created, not only by the carbon monoxide from the heater, but also from oxygen depletion from combustion and the soldiers' own breathing.

A factor in this accident was the use of an unvented COTS heater. Warnings specified in ground precautionary messages indicate that the use of unvented heaters is inherently dangerous because they vent exhaust containing carbon monoxide into living spaces. Similar warnings, as well as risk-mitigation steps, to include following manufacturer's instructions, leaving tent doors and roof flaps open to allow air circulation, and using carbon monoxide detectors appear in safety-of-use messages as well as on the heater itself. Despite these warnings, the chain of command failed to inform or train subordinates of the dangers involved when using unvented heaters.

The soldier crew tent also poses a hazard in that its fabric does not breathe. As noted in the operator's manual, all windows and flaps must be open to provide adequate ventilation. If windows and flaps are closed, it is possible to use all oxygen contained in the tent, especially during sleeping hours, resulting in death. The tent, in combination with an unvented heater, creates a high-risk hazard of possible suffocation and carbon monoxide poisoning. These dangers must be carefully risk-managed with control measures that ensure the safe use of the tent during sleeping periods.

Another contributing factor in this accident was the implied approval by the chain of command of unvented propane heater use. Soldiers continually observed their use in the field, so they assumed it was a normal procedure. Both the chain of command and the users became complacent in its use, and these actions subsequently led to the accident. Supervisors at all levels must use risk management to identify potential hazards and establish controls to ensure the safety of subordinates. Leaders **must** enforce standards and continually be aware of possible hazards. In this case, the chain of command tacitly allowed the risk to exist and failed to follow their established procedures. Enforce the standards—don't let this silent killer get to you or your subordinates.

—BG Gene M. LaCoste, Director of Army Safety

Truth or Consequences

This is the second of a 5-part series on the risk management process. This article focuses on Step 2 "Assess the hazards."

In the past 18 months, I have had the unfortunate task of investigating accidents that resulted in the deaths of 14 soldiers. Without exception, these soldiers were performing their duties in an outstanding manner; giving their all; working hard to carry out their missions for their units, the Army, and the nation. They made the ultimate sacrifice in the service of their country.

I will never forget what these soldiers have done. I will also never forget that during many of these investigations, I was told that others knew of the dangers these soldiers and their comrades faced while performing their duties. That's right...in many cases, someone had already identified that something wasn't right. They had identified the hazard. Unfortunately, they did not fully appreciate the likelihood that an accident would occur because of this hazard or the severity of the consequences. They ignored the critical Step 2 of the risk management process.

Last month, we discussed the first step in the Army's 5-step risk management process—Identify hazards—in an article titled "Have We Forgotten How to Teach What Right Looks Like?" Now, we'll look at Step 2: Assess the hazards. We'll discuss the importance of truthfully assessing risks associated with those hazards we identified. And, we'll also discuss gambling with the consequences of performing tasks and executing missions with hazards inadequately assessed.

Field Manual 100-14, *Risk Management*, states that step two takes place after you have identified a hazard. To assess the hazard, first determine the probability of a hazardous event occurring, and then address the potential severity resulting from this hazardous event. In other words, once you know that something doesn't look right, make an assessment of how likely it is that this hazard will cause harm to you, your unit, your equipment, or your mission. Then determine that ***IF*** an accident occurs as a result of the hazard, how ***MUCH*** harm will it cause?

Conducting an effective assessment requires broad understanding of the task/mission at hand. The person making the assessment uses his knowledge of applicable regulations, procedures, and SOPs. He also uses his experience in performing this or similar tasks. In fact, experience can sometimes be the most valuable tool for leaders to use. This experience is based upon what he has observed, read, or what he's been told. Let me give an example.

During a deployment to a desert training area, a support platoon was driving many miles during both daylight and darkness in support of their tank battalion. During these movements, the dust from the vehicles could be seen for miles. The platoon sergeant, who had deployed to the desert numerous times throughout his career, informed his platoon leader of the problems associated with driving in the desert. The platoon leader did not think it was a major problem, so he did not take it into consideration while completing his daily risk assessment.

One day at the evening convoy briefing, the platoon leader instructed the drivers to maintain only 50 meters distance between vehicles during that night's movement to avoid separation among the vehicles. When several of the drivers expressed concern about this requirement, the platoon leader stated that it was unlikely that following so close would cause any problems, and that the drivers would just need to stay alert during the mission.

As you've probably already guessed, this platoon leader failed to properly

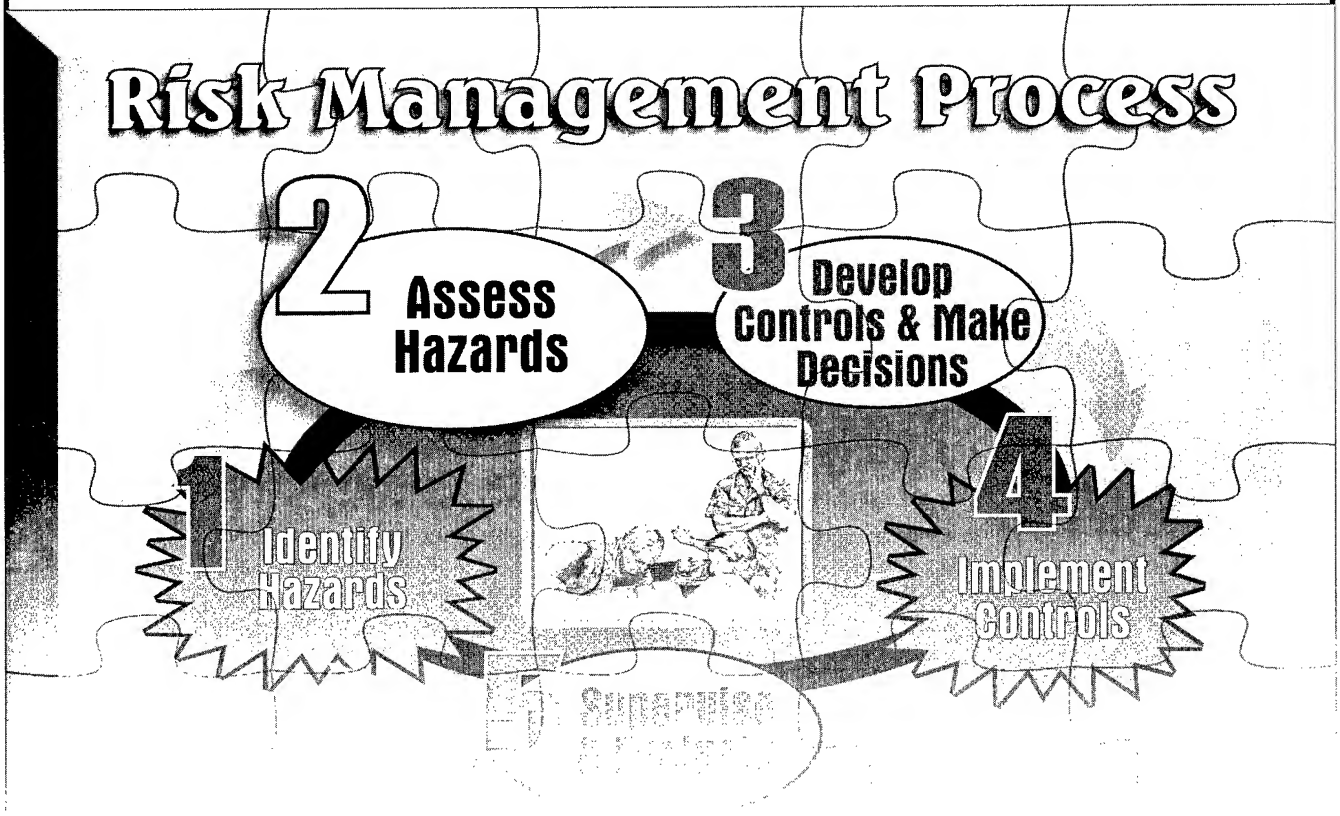
gauge the impact of his decision. At one point during the night move, the platoon leader stopped his vehicle abruptly. The 5-ton truck that was following him had to brake hard to avoid a collision. The next two vehicles were also able to avoid a collision. However, the last three vehicles in the convoy were not as fortunate. The collision resulted in two injured drivers and three heavily damaged vehicles. All because the platoon leader failed to properly assess the hazards his unit faced. Regrettably, he did not learn from the experience of the platoon sergeant; neither did he recognize that hair stood up on the back of his men's necks when he described the plan of operation; nor did he appreciate the courage it took for his platoon sergeant and his unit to raise concerns for their personal safety and the success of their mission.

No, the platoon leader didn't have the personal experience to adequately assess the hazard. But he had plenty of clues and opportunities to get to the truth about the risk and consider the consequences. One of the Army's great strengths is learning from the successes and failures of each other, and growing stronger on that foundation.

The next time you see something that just doesn't look right, take a moment and ask yourself how this might impact you, or the soldier next to you, or your unit, or the family of four who might be driving down the road as your convoy approaches. Safety is not a sometimes thing, and your actions don't just affect you. Exercise the courage to tell the truth about the hazards, and to face the *potential* consequences. That way, you and your unit can *avoid* those consequences.

This information gives you as an individual, your unit, and the Army an advantage: Armed with knowledge that the hazards in your task or mission are identified (Step 1); and the hazards are assessed (Step 2); now, controls can be developed and selected (Step 3). Stay tuned for more on Step 3 next month here in *Countermeasure*.

POC: LTC Andrew Atcher, Ground Systems and Accident Investigation Division, DSN 558-9525 (334-255-9525), atcherd@safetycenter.army.mil



Safety Messages

The following is a list of selected safety of use messages (SOUMs) and ground precautionary messages (GPMs) issued by Army Tank-Automotive Command (TACOM).

Complete copies are available on the Army Electronic Product Support Bulletin Board via the Internet web site at **http://aeps.ria.army.mil/.**

■ **M240B, M240D, and M240G Machine Guns**, 151914Z Jan 01, subject: GPM 01-006. The M240B, NSN 1005-01-412-3129, M240D, NSN 1005-01-418-6995 and the M240G, NSN 1005-01-359-2714. The safety on the M240B, M240D and M240G machine guns can be forced on or actuated by manipulation of the bolt/op rod assembly. Application of the safety without locking the bolt all the way to the rear can cause the gun to jam during efforts to fully charge the weapon or, if done during loading procedures, can cause an inadvertent firing of one round when the cover is slammed closed or during efforts to clear the weapon. POC: Craig L. Haas, DSN 798-0023, haasc@ria.army.mil.

■ **Bradley Fighting Vehicle Variants,** 310020Z Jan 01, subject: TACOM SOUM 01-007: M2A2, NSN 2350-01-248-7619, LIN F40375; M2A2-ODS, NSN 2350-01-405-9886, LIN F40375; M2A3, NSN 2350-01-436-0005, LIN F60564; M3A2, NSN 2350-01-248-7620, LIN F60530; M3A2-ODS, NSN 2350-01-405-9887, LIN F60530; M3A3, NSN 2350-01-436-0007, LIN F90796, M6 Linebacker, NSN 2350-01-448-0368, LIN C00384; M7 BFIST, NSN 2350-01-432-1526, LIN F86571. We have discovered that some Bradley brake connecting rods were not manufactured according to specifications and may fail, breaking in two. There has been one known failure since 1993. POC: Gary Oswald, AMSTA-LC-CLB, DSN 786-7524 (810-574-7524), oswaldg@tacom.army.mil.

■ **M939-Series Trucks,** 252325Z Jan 01, subject: TACOM SOUM 01-006. Effective immediately, any M939-series truck speedometer that appears to be stuck, jerks, or does not move will be considered not fully mission capable. This is to ensure the truck is not operated at speeds over 40 MPH. This only applies to trucks without the ABS braking system. POC is Floyd Burns, DSN 786-5703 (810-574-5703), burnsf@tacom.army.mil.

■ **Heavy Equipment Recovery Combat Utility List and Evacuation System (HERCULES)**, 161438Z Feb 01, subject: SOUM-01-009, Technical Inspection of the HERCULES, NSN 2350-01-390-4683, Model M88A2, LIN R50885. The HERCULES has experienced a catastrophic failure of one stayline arm. Should this type of failure occur during lifting operations, the boom could collapse and drop the load resulting in damage to equipment and possible injury or death to personnel. Based upon metallurgical and engineering analysis, the root cause of the failure is a high order side impact coupled with casting discontinuity. The HERCULES crews are instructed not to operate the boom for lifting any load and leave it in the stowed position. POC: David Boster, DSN 786-5310 (810-574-5310), bosterd@tacom.army.mil.

Remember When...

How many times have you expressed this thought to yourself or to a friend? I know I have said it at least a million times. Recently while sitting in a restaurant, I noticed a soldier who I had served with 12 years ago. He didn't notice me, so I went to him and asked if he has had any more shocking experiences. He had a puzzled look on his face. I said, "Remember when we were in the Tactical Operation Center (TOC) during that miserable lightning storm?"

"Oh yeah, my ears are still ringing!" he replied. Lightning had somehow energized the landline, and then traveled through the SB-22 switchboard to the headset he was wearing while sitting on a metal folding chair at a field table. The shock launched him 3 feet from the chair. He was okay—just a little shook-up. Of course at the time, we were all concerned about him. After reassuring him and ourselves that all was well, we chuckled and everyone returned to work.

Now, years later, I realize the error I made in this potentially deadly situation—I failed to report this incident to my chain of command. Reporting near-misses is critical in reducing accidents and keeping events like this from happening again.

The Army Safety Center looks very closely at all incidents that are submitted to them. These reports are reviewed and acted upon by subject matter experts. These experts interface with design engineers and other safety engineers to correct deficiencies. The problem may not lie in the design, but in human error with respect to how we utilize the equipment. The Safety Center makes that determination and ensures the correct information is relayed to the field. They may even develop a training program to ensure we use the equipment correctly.

So, how do we report near-misses? Near-misses should be reported to your unit Safety NCO or Officer. They will make sure it is submitted through appropriate channels to the Safety Center. It is important to report these near-misses so that you won't ever use the expression, "Remember when the lightning killed SGT Williams?"

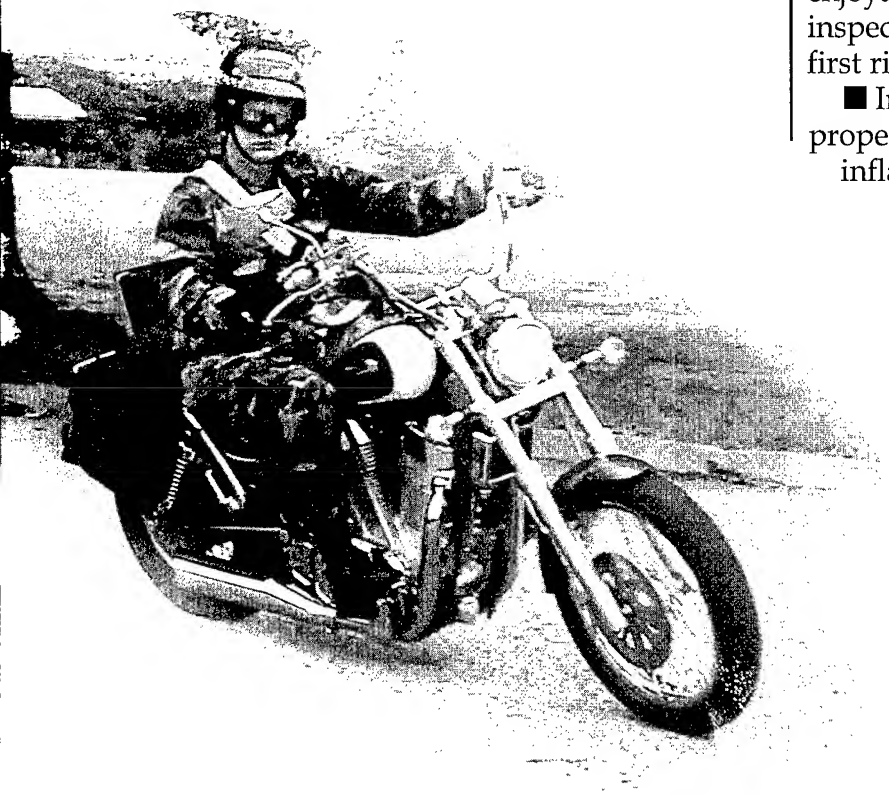
Editor's note: This is the type story we look forward to receiving. Don't be afraid to admit that you made a mistake. We all make mistakes, no one is perfect. By learning from other people's experiences/ mistakes, we hopefully don't have to learn the hard way. Thank God, this soldier lived to tell us! Remember that you don't have to be in the middle of a fully loaded munitions storage area surrounded by a raging fire to have a valid story to tell. Many times, we have an emergency situation or a problem; and although nothing exciting happens, a lesson is learned. These first-hand experiences are extremely effective in teaching, proving a point, or supporting your way of doing things – and everyone can identify with them. And by the way, no one has ever gotten into trouble by writing an article for us.

POC: Don Ferrier, CP-12 Intern, U.S. Army Safety Center, DSN 558-3262, ferried@safetycenter.army.mil

Are You Ready for the Road?

It's a beautiful spring morning and the bikes are out on the road—motorcycles of all shapes and sizes, and riders of varying experience levels. It's hard to beat the joy of rolling down the open road on a motorcycle. However, before you to hit the road (hopefully, not literally), it is important to be prepared.

I have been riding motorcycles for over 20 years—dirt bikes, touring bikes, and everything in between. I would like to share with you a few things I've learned over the years.



A few years ago, I attended an advanced skills riding course in the spring. I was somewhat surprised to see how much I had forgotten over the winter. I recommend finding some type of refresher course, advanced skills riding course, or some other motorcycle safety course before taking to the streets this year.

Like many other skills, riding skills are perishable. Due to the climate in many parts of the country, the motorcycle-riding season can be relatively short. And your riding skills may not be as sharp in April as they were in November when you last rode your bike. Another point to consider is that automobile drivers have not dealt with motorcycles for a while either. Remember that it is the rider's responsibility to keep mentally alert.

Don't forget to consider roadworthiness of your bike. Just because it was "okay" when you put it up last fall doesn't mean it's road ready now. A good initial inspection and routine maintenance will go far in ensuring a safe and enjoyable riding season. I like to thoroughly inspect my motorcycle prior to taking it on my first ride of the new season. For example:

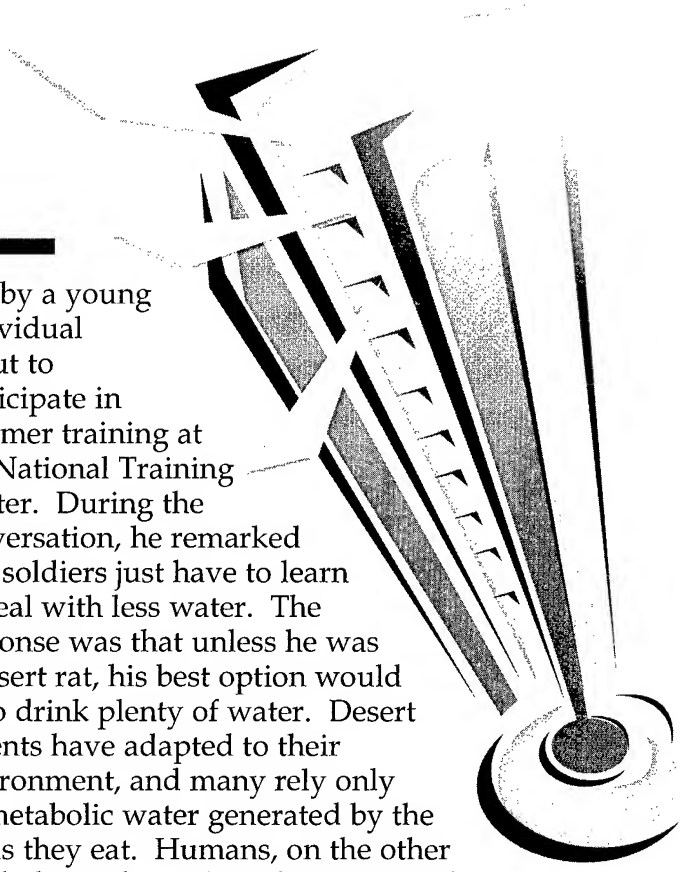
- Inspect your tires for dry rot/damage and proper tread depth. If the tires are serviceable, inflate to the proper operating level.
- Inspect your braking system to include brake pads, discs, and fluid levels. Always service your braking system IAW manufacturer's instructions.
- Ensure all fuses, lights, and horns are in good working order. Replace bad fuses and burned-out bulbs as required.
- Service all fluids and check for any leaks. Also, do a bolt check and tighten up anything that may be loose.
- Check the charge on your battery and service if necessary. If servicing is required, always follow the correct safety procedures and wear the appropriate personal protective equipment (PPE).
- Inspect your riding PPE to make sure it is serviceable.

These components can affect the safe operation of your motorcycle. This certainly is not a comprehensive checklist. You should tailor your inspection to the type of motorcycle you ride and the manufacturer's recommendations.

Before you start riding this year, take some time to prepare yourself and your motorcycle for a safe, enjoyable year of riding. You'll be glad you did. See you on the streets!

POC: CPT Todd I. Brattmiller, A Co. 1-145th Avn. Regt., Ft. Rucker, AL. CPT Brattmiller is currently attending the Texas A&M Master's Safety Program here at Fort Rucker.

Understanding Heat Injuries



Throughout the ages, militaries have faced and, in many cases, been defeated not by a superior invading force, but by various elements of our environment—one major element being heat. In 24 B.C., an entire Roman army was decimated by extremely hot conditions. During the 1967 War between Israel and Egypt, the Egyptians sustained over 20,000 heat casualties while heat casualties among Israeli forces were minimal. More recently, in 1982 during the peacekeeping operation in the Sinai, one U.S. Army company sustained 30 percent heat casualties. All individuals had to be treated with IV fluids.

The fact that heat is such an important environmental factor affecting us has to do with our physiology. Human beings are homeothermic, which simply means that we are able to maintain a constant body temperature regardless of our surrounding conditions—up to a point. Human body temperature is regulated in a very narrow range. In order to maintain a constant body temperature, sweating begins, which evaporates thereby cooling the body. Another way the body cools itself, but to a lesser extent, is by diverting blood flow from muscle tissues and deep sites of heat production to the surface of the skin. Have you ever noticed how the veins of your hands seem to "pop out" when you're really hot? Also, a very small amount of cooling takes place through the lungs; but for the most part, this is negligible.

As environmental temperature rises, the body's main way of regulating body temperature is by the evaporation of sweat. Obviously as you sweat, your body is losing moisture, which means it must be regularly replaced. You cannot train your body to perform with less water.

A remark was made a number of years ago by a young individual about to participate in summer training at the National Training Center. During the conversation, he remarked that soldiers just have to learn to deal with less water. The response was that unless he was a desert rat, his best option would be to drink plenty of water. Desert rodents have adapted to their environment, and many rely only on metabolic water generated by the foods they eat. Humans, on the other hand, do not have this adaptation and must drink water. We can, however, adjust to changes in our environment through a process called acclimatization. As the body acclimatizes to a hotter climate, a number of physiological modifications occur. Among these is an increase in sweating by approximately 10 percent. Acclimatization, however, does not occur immediately. It usually takes an individual approximately 7 days to acclimatize. This is an important point to remember when a unit deploys from a cooler climate to a much hotter one and especially when dealing with new recruits.

As you sweat, your body is losing moisture, which means it must be regularly replaced. You cannot train your body to perform with less water.

During WWII, it was found that the soldier most vulnerable to heat injury was an overweight recruit from the northern part of the U.S. undergoing summer training in a southern state. (Those of us who have been in Alabama, Georgia, and the other southern states during August completely understand this statement.) This leads to another point regarding heat injuries—physical condition.

Heat injury is not only influenced by the

amount of heat to which an individual is exposed, but also by the general condition of the individual. Infections, fever, sunburn, fatigue/lack of sleep or food, older age, being unfit, and being overweight make an individual more susceptible to heat injuries. Certain medications such as cold medicines reduce an individual's ability to regulate heat.

Once the body loses its ability to regulate heat, a heat injury ranging in severity from heat cramps to heat stroke will occur. With any type of heat injury, if the victim is not getting better quickly or you just are not sure—don't waste time, find medical help immediately—no one should ever fault you for getting extra expert help. If they do, they are wrong.

Warning Signs

■ **Heat cramps** are painful cramps of muscles, usually in the stomach, legs, and/or arms. They are caused by excessive amounts of salt loss. Body temperature is normal.

✚ First-aid for heat cramps involves moving the individual to a cooler area and loosening his clothing. Have the individual drink a 0.5 percent salt solution of water (one canteen of water with ¼ teaspoon salt). If the cramps continue after drinking the salt solution, call for medical assistance.

■ **Heat exhaustion** is the most common form of heat injury. Symptoms include dizziness, rapid pulse, nausea, headache, profuse sweating, pale face, weakness, or collapse. Body temperature is normal or slightly elevated. Heat exhaustion and heat cramps may occur simultaneously.

✚ First-aid is the same as one would administer for heat cramps, except that attempts should be made to cool the individual by pouring water over him, and then fanning to assist in evaporation. Also, have the individual drink plain water when he has muscle cramps. Elevating his legs also helps. If he does not respond to first-aid, call for medical assistance.

■ **Heat stroke or sunstroke is the most serious heat injury, and it is a life-threatening situation requiring immediate medical attention.** During a heat stroke, the body has completely lost its ability to regulate heat, and the individual's body temperature rises quickly to dangerous levels. An individual suffering a heat stroke may vomit, collapse, be confused, delirious or argumentative, or have headaches. The skin may be hot and dry, indicating that sweating has stopped, and the body can no longer cool itself by evaporation. There is an important difference between heat exhaustion and heat stroke, but it is not always seen. With heat stroke, the body temperature is 104 degrees or higher. **If you are not sure if it is heat exhaustion or heat stroke, assume it is the latter.**

✚ **Evacuate to a medical facility as soon as possible!** Administer first-aid while help is on the way. It is extremely important to cool the body as rapidly as possible—soak or douse the victim with water; if you have ice packs, use them, and fan to cool. Start IVs if a combat lifesaver or medic is available. Have the individual drink only if he is conscious; never try to force water on an unconscious person. The fatality rate of heat stroke is high. Also, an individual who has experienced a heat stroke before is more prone to a recurrent attack. This is an important point for leaders at all levels.

Although the results of heat injuries can be severe, fortunately they are preventable. The four major ways of prevention are (1) fluid replacement (drinking water), (2) wet bulb globe temperature (WBGT) monitoring, (3) work/rest cycles (based on the WBGT), and (4) acclimatization. Commanders can also allow modification to the uniform, like unblousing boots or unbuttoning BDU jackets. Remember that removing BDU jackets may increase the chance of sunburn, so take this step only with caution.

DRINKING WATER regularly is critical. In a hot environment and during periods of heavy work, thirst is no indicator. Sport drinks are also helpful in replacing fluids and nutrients lost during times of heavy work activity, but they are no substitute for water. Use the fluid replacement guidelines in the chart on page 13.

Everyone in the military is familiar with the WBGT Index. It was originally designed over 40 years ago to assist in reducing heat casualties among military trainees. Today, it is considered by many organizations to be the best indicator of heat stress on the body. It works by incorporating the effects of air velocity and humidity (wet bulb), air temperature (dry bulb), and radiation (globe temperature). It is a helpful tool when determining work/rest cycles.

Fluid Replacement Guidelines for Warm-Weather Training (Applies to Average Acclimated Soldier Wearing BDU, Hot-Weather)

		Easy Work		Moderate Work		Hard Work	
Heat Category	WBGT Index °F	Work/ Rest*	Water Per Hour	Work/ Rest*	Water Per Hour	Work/ Rest*	Water Per Hour
1	78-81.9	No limit	½ qt	No limit	¾ qt	40/20 min	¾ qt
2 (Green)	82-84.9	No limit	½ qt	50/10 min	¾ qt	30/30 min	1 qt
3 (Yellow)	85-87.9	No limit	¾ qt	40/20 min	¾ qt	30/30 min	1 qt
4 (Red)	88-89.9	No limit	¾ qt	30/30 min	¾ qt	20/40 min	1 qt
5 (Black)	>90	50/10 min	1 qt	20/40 min	1 qt	10/50 min	1 qt

*Rest means minimal physical activity (sitting or standing) and should be accomplished in the shade if possible.

Note 1: The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Individual water needs will vary ± ¼ quart per hour.
Note 2: CAUTION: Hourly fluid intake should not exceed 1¼ quarts. Daily fluid intake should not exceed 12 quarts.
Note 3: Wearing MOPP gear adds 10°F to WBGT Index.
Note 4: Wearing body armor adds 5°F to WBGT Index.

Examples:

Easy Work	Moderate Work	Hard Work
O Walking hard surface at 2.5 mph, ≤30-pound load O Weapon maintenance O Guard duty O Marksmanship training O Drill and ceremony	O Walking hard surface at 3.5 mph, ≤40-pound load O Walking loose sand at 2.5 mph, no load O Calisthenics O Patrolling O Individual movement techniques; i.e., low crawl, high crawl O Defensive position construction	O Walking hard surface at 3.5 mph, ≥40-pound load O Walking loose sand at 2.5 mph with load O Field assaults

Note: Soldiers who are overweight, dieting, or past heat casualties are more prone to heat injuries. As a result, their activities must be closely monitored.

Leaders must ensure that the WBGT index is taken in a location that closely approximates the area where soldiers are training or working. In other words, if the environmental conditions at your training site are different from the conditions found at the preventive medicine activity where the WBGT index is being monitored, it is best to measure the WBGT index at your location. The Weksler kit, which is designed for field use, is a small WBGT kit with a slide rule that is used to determine the WBGT index. Preventive Medicine Activities can assist in training soldiers how to use this kit.

When mission requirements do not allow time for adequate acclimatization, both leaders and soldiers must ensure soldiers drink adequate water, and they must remain alert for the signs and symptoms of heat injury.

The guidelines on the previous page from FM 21-10 can greatly assist in reducing heat injuries.

Heat injuries can be deadly, and they can leave a military force virtually combat ineffective. The fact that the Israelis had minimal heat casualties in 1967 compared to the numerous heat causalities among the Egyptians isn't because of luck. Leaders of the Israeli Army place intense emphasis on the prevention of heat injuries. To prevent heat injuries, leaders must enforce heat injury prevention programs, and soldiers must ensure they practice individual protective measures.

More information on heat injuries and heat injury prevention can be found in:

- FM 4-02.17, *Preventive Medicine Services*, 28 Aug 00
- FM 21-10, *Field Hygiene and Sanitation*, 21 Jun 00
- FM 21-10-1, *Unit Field Sanitation Team*, 11 Oct 89
- GTA 5-8-12, *Individual Safety Card*, 25 Feb 99
- TB Med 507, *Prevention, Treatment and Control of Heat Injury*, 25 Jul 80 (under revision)

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How Much Is Too Much?

The flip side of dehydration is overhydration—or simply, drinking too much water too quickly. When sodium is lost through sweating and water is drunk as the replacement fluid over a period of hours, the sodium left in the blood can become diluted. This can cause a condition called "hyponatremia," which can lead to damage in certain kinds of tissues in the body. Changes are most noticeable in the nervous system where seizures, coma, and even death can occur.

Recognizing overhydration or

hyponatremia is challenging because the symptoms may resemble those of heat stroke or heat exhaustion. Early symptoms can include confusion, nausea, fatigue, muscle cramps, and weakness. More serious symptoms include vomiting, muscle twitching, delirium, seizures and coma. The main difference between heat stroke and heat exhaustion, when compared to overhydration, is that overhydration doesn't cause the victim's temperature to rise. Because overhydration can be deadly, the final diagnosis must be made at a medical facility where the victim can be properly treated.

If all this talk about hydration and sodium balance sounds intimidating, relax. Most soldiers are taught to drink one canteen (one quart) of water per hour when working in the heat.

Cold-Water Warning May Save Lives

The extreme danger of cold water—water that is below 70°F—can lead to hypothermia...even in warm weather. The chart below shows the effects of hypothermia in water. Loss of body heat to the water is a major cause of deaths in swimming and boating accidents. Often the cause of death is listed as drowning; but time and again, the primary cause is hypothermia. Leaders should train soldiers to watch for the following symptoms in themselves and each other:

- Shivering, which signals a drop in body temperature.
- Bluing or darkening of lips, earlobes, fingers, or toes.
- Unusual or uncontrollable breathing, such as sudden gasping or rapid breathing.
- Slight cramps.
- Difficulty using hands.

Soldiers having these symptoms should be removed from the water as fast as possible and warmed.

Personal flotation devices (PFDs), or better known as life jackets, can increase survival time because of the insulating value they provide. In water less than 50 degrees, you should wear a wetsuit or dry suit to protect more of the body.

Some points to remember to increase your chance of survival:

- While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Even treading water chills the body faster than remaining still while wearing a life jacket.
- Keep your head out of the water—this will increase your survival time.
- Keep a positive attitude about your rescue.
- If there is more than one person in the water, huddling is recommended.
- Always wear your life jacket. It won't help if you don't have it on.

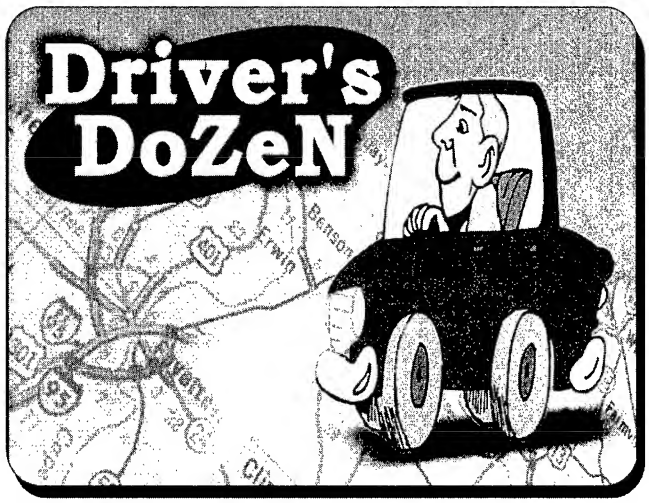
Editor's note: It should also be noted that alcohol lowers the body temperature around 2-3 degrees by dilating the blood vessels. Do not drink alcohol around cold water.

Hypothermia Chart

Water Temperature(°F)	Exhaustion or Unconsciousness	Expected Survival Time
32.5	Under 15 min	Under 15 - 45 min
32.5 - 40.0	15 - 30 min	30 - 90 min
40 - 50	30 - 60 min	1 - 3 hrs
50 - 60	1 - 2 hrs	1 - 6 hrs
60 - 70	2 - 7 hrs	2 - 40 hrs
70 - 80	3 - 12 hrs	3 hrs - Indefinitly
Over 80	Indefinitly	

Get the New Video—

It's about a young soldier who encounters Sergeant Safety during inprocessing at his first duty station. Sergeant Safety takes the young soldier around the installation and focuses on the 12 key areas of traffic safety. In the process, the soldier begins to understand that traffic safety is more than just rules.



Attention Commanders and First Sergeants!

The Safety Center has a new video ready for you to use as part of your POV traffic safety program. It's a remarkably brief (15 minutes), lively and entertaining show in which SGT Safety targets 12 traffic safety points and shows the consequences of bad driving decisions. Every soldier, family member, and new civilian employee should see it. Driver's Dozen is available now:

- Go to our website: **http://safety.army.mil**
- Click on MEDIA-VIDEOS-POV VIDEOS-Driver's Dozen

A Facilitator's guide is available for download, as well as ordering instructions.

DRIVER'S DOZEN

1. Seatbelts—*Cut your chance of being killed or seriously injured.*

2. Airbags—*Allow 10 inches between steering wheel and driver, in case it inflates.*

3. Child safety—*Use the correct child safety seat; 12 years and under—"Back is where it's at."*

4. Motorcycle safety—*It won't be pretty to see what's left after the G-forces perform experiments on your body. Wear the following protective equipment—*

- DOT-approved helmet
- Eye protection
- Long-sleeved shirt or jacket
- Long trousers
- Brightly colored top during day
- Reflective during night
- Full-fingered gloves
- Sturdy footwear (leather boots or over-the-ankle shoes)

5. Bicycle safety—

- Use marked paths when possible.
- See and be seen; wear proper clothes and reflectors.
- "Go with the flow" when riding on the street (in the same direction as vehicle traffic), and use hand signals when turning.
- Wear a helmet.

6. Pedestrian safety—

- Use marked paths when possible.
- See and be seen; wear proper clothes and reflectors.
- "Go with the flow" when skating on the street (in the same direction as vehicle traffic), and use hand signals when turning.
- Wear protective equipment—helmet, wrist guards, and knee/elbow pads.
- Make sure your equipment fits and is properly adjusted.
- Especially watch for children walking to and from school, loading and unloading school buses, and playing in housing areas.

7. Headphone use—*The ONLY place you can listen to tunes is on a track.*

8. Vehicle inspections—*Download checklist from http://safety.army.mil. List includes—*

- Safety belts
- Lights
- Window tint
- Exhaust system
- Brake systems
- Wipers
- Horns
- Suspension
- Steering systems
- Wheel assemblies
- Tires

9. No laser or radar detectors are allowed on post.

10. Alcohol—*No open containers in passenger compartment.*

11. Post-specific rules—*Ask your first-line supervisor.*

12. Driver's training—*4 hours of training for age 26 and under.*

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